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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/702,870	11/01/2000	Keiichi Den	ROH-030	9736

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EXAMINER

THAI, LUAN C

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 12/21/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/702,870

Applicant(s)

DEN, KEIICHI

Examiner

Luan Thai

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Title

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of "a heat radiator" in claims 11, 15-16 and "a heat sink" in claims 12-13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4-6, 9-10 and 21 rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (5,821,625 Applicant admitted prior art).

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Regarding claims 1, 6, 9-10, and 21, Yoshida et al. (figures 1-19, specifically figures 1-15) show a semiconductor device comprising: a first semiconductor chip 5; a second semiconductor chip 1 bonded onto the first semiconductor chip 1 in stacked relation, wherein chip 5 is greater in size than chip 1; a noise shield film (7-12-18-23) provided between the first and second semiconductor chips 5-1 for preventing the first and second chips from being mutually influenced by noises thereof (Col. 2, lines 24+, 38+, Col. 9, lines 47+).

Regarding claim 2, although Yoshida et al. do not explicitly teach a connection mechanism which connects the noise shield film to a power supply portion, this feature (the connection mechanism) is seen to be an inherent teaching of Yoshida et al.'s device since a means for providing ground source for the noise shield film (7, 12, 18, 23) is disclosed (figures 2, 4b, 6, and Col. 4, lines 46+) and it is apparent that some type of connection mechanism must be present for interconnecting the noise shield film and the ground source for the noise shield film to function as intended.

Regarding claims 4-5, Yoshida et al. further disclose chip 1 and chip 5 being electrically connected via bump 4, wherein bump 4 is composed of the same material as the noise shield film (Col. 5, lines 58+, Col. 6, lines 8+).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7-8 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (5,821,625 Applicant admitted prior art).

Regarding claims 7-8 and 22, Yoshida et al. disclose(s) the limitations of the claimed invention as detailed above including the noise shield film comprising a shield portion which covers an area in which the major surface of chip 1 and an extension portion extending outwardly from the shield portion on a surface of the first chip 5 (figures 2-6). However, Yoshida et al. do not explicitly teach a major noise source is present in the second chip 1. The claimed of the major noise source being present in the second chip 1 is considered to be obvious over the device of Yoshida et al. Note that the noise shield film (7-12-18-23) is provided between the first and second semiconductor chips 5-1 for preventing the first and second chips from being mutually influenced by noises thereof; thus, the noise source could be present in either chips 5-1 or both.

Regarding claims 23-24, Yoshida et al. disclose the limitations of the claimed invention as detailed above including the noise shield film of metal (7-12-18-23) being provided on the main surface of the second semiconductor chip 1 (figures 2, 4b, 6, etc.). It would have been obvious for the metal film (7-12-18-23) formed on the main surface of the second semiconductor chip 1 to be considered as a heat release path for releasing heat from the main surface of chip 1.

The further citations of claim 25 would have been obvious for the similar reasons set forth in the discussion of claim 4 above.

7. Claims 3 and 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (5,821,625 Applicant admitted prior art) in view of Fujimoto et al. (5,930,599).

Regarding claim 3, Yoshida et al. disclose the limitations of the claimed invention as detailed above including the suggestion of the device comprising a lead frame (Col. 4, lines 42+) but Yoshida et al. do not clearly teach the connection structure of the device and the lead frame.

Fujimoto et al. (figures 1-10) while relate to a similar semiconductor package design teach a device of a stacked chip die bonded to a lead frame with plurality of lead fingers 32-132 wire bonded 33-133 to the device for providing external terminals for the device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the lead frame as taught by Fujimoto et al. to Yoshida et al.'s device in order to provide the external terminals for the device including a power source, a ground potential, and in/out signal.

Regarding claims 11-14, the proposed device of Yoshida et al. and Fujimoto et al. disclose(s) the limitations of the claimed invention as detailed above, wherein the noise shield film of metal (7-12-18-23) provided between the first and second semiconductor chips 5-1 (figures 2, 4b, 6, etc.) is considered as

a heat conductive member for the reasons set forth above (in claims 23-24), and one of leads 32-132 of the lead frame would be connected to the heat conductive member 7-12-18-23 via bonding wires 33-133 (as the discussion above in claim 3). The proposed device of Yoshida et al. and Fujimoto et al. does not teach a heat radiator from which the heat conductive member connected to. It would have been obvious for the metal lead 32-132 which electrically and thermally connected to the heat conductive member (7-12-18-23) to be considered as the claimed "heat radiator" since leads 32-132 are exposed outside the package body and heat radiating is a characteristic of metal lead frame. In addition, the claimed structure does not distinguish over the proposed device of Yoshida et al. and Fujimoto et al. Therefore, the claimed structure is considered to be obvious over the proposed device of Yoshida et al. and Fujimoto et al.

Regarding claim 15, the proposed device of Yoshida et al. and Fujimoto et al. disclose(s) the limitations of the claimed invention as detailed above wherein the heat conductive member (7-12-18-23) is a metal film having an extension portion from the vicinity of the heat source of the second chip 1 to a surface portion of first chip 5 not covered with the second chip 1. Yoshida et al. do not explicitly teach a major heat source is present in the second chip 1. The claimed of the major heat source being present in the second chip 1 is considered to be obvious over the proposed device of Yoshida et al. and Fujimoto et al. Note that the heat conductive member (7-12-18-23) is formed on the main surface of the second semiconductor chips 1 and the claimed structure does not distinguish

over the proposed device of Yoshida et al. and Fujimoto et al. Therefore, the claimed structure is considered to be obvious over the proposed device of Yoshida et al. and Fujimoto et al.

Regarding claim 16, since the metal layer (7-12-18-23) can be formed of two layers (Col. 5, lines 58+), it would be obvious to read on the claimed of a first and a second metal films provided on the surfaces of the first and second chips 5-1, respectively.

The further citations of claims 17-20 would have been obvious for the similar reasons set forth in the discussion of claims 25, 5, 3, and 9 above, respectively.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Luan Thai
December 15, 2001